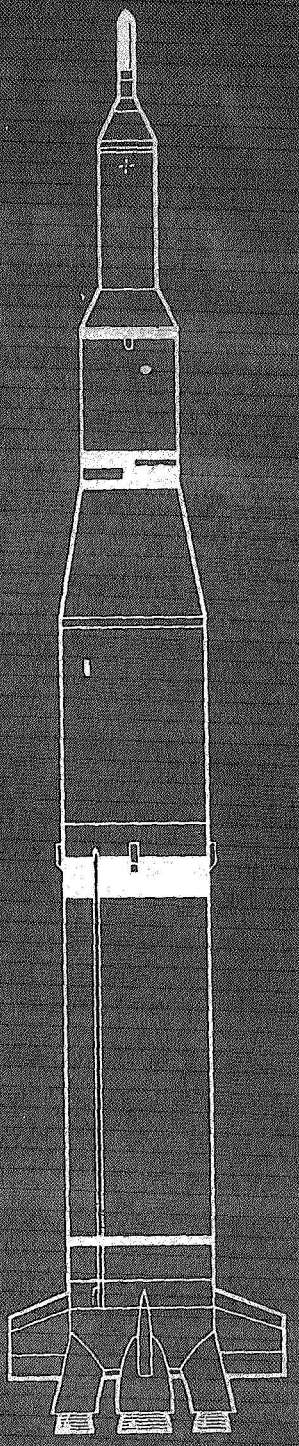
SECOND SEMI-ANNUAL REPORT

SYRACUSE/NASA PROGRAM

for the period

July 1, 1968 - December 31, 1968



National Aeronautics and Space Administration

Syracuse University

SECOND SEMI-ANNUAL REPORT
SYRACUSE/NASA PROGRAM
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Grant No. NGL 33-022-090 for
"Multidisciplinary Studies in Management and
Development Programs in the Public Sector"

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"Training of Graduate Students in Administration and
Management Relevant to Large Scientific and
Technological Programs"

SYRACUSE UNIVERSITY

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INTRODUCTION

Four major research projects, several smaller research activities, and an education and training program for graduate students are presently well under way at Syracuse University as a result of the association between the University and the National Aeronautics and Space Administration. The research and educational activity carried out under the Syracuse/NASA Program involved during this reporting period approximately twenty faculty members and fifteen graduate students from the Maxwell School, and the Colleges of Engineering, Law and Business.

General direction of the Program, since it is a University-wide endeavor, was under the jurisdiction of Vice President Clark D. Ahlberg (Research and Administration) until September 1, 1968; and after his departure from the University, under Vice President Frank P. Piskor (Academic Affairs). A committee of the Deans of the four participating schools and colleges maintained general cognizance over the Program, being kept informed by the Director and Associate Director of the Program, Professor John C. Honey (The Maxwell School) and Professor Nathan Schwartz (College of Engineering) respectively, and by the project directors. The project directors are: Professor Richard Hopeman (Business) and Martin Barzelay (Engineering) for the studies on Role of the Project Manager; Professor Peter Franck (Business) for studies of NASA-Business Relations; Professor George Alexander (Law) for studies of Regulations in Space; and Professor Edwin Bock (Political Science) for Case Studies. The Syracuse University Research Institute maintains administrative cognizance over the Program. Headquarters of the NASA Program is located at 133 Stadium Place, adjacent to the campus, where offices, a conference and reading room are provided.

The period covered by this report was characterized by four major efforts.

First, it was a period of major progress in the research of the four multidisciplinary project teams. Field trips were taken by various team members to NASA Headquarters in Washington and to field centers.

In some cases, research methodology was redefined and research designs were reshaped. Several preliminary papers, based on information gathered during this period, were written. Thesis and dissertation research was begun by graduate students associated with the projects.

A program of education and training for graduate students associated with the research as well as those holding NASA Traineeships was begun. Graduate-level seminars were offered, and summer field training for several students was accomplished. University-wide seminars for faculty and students were offered and well attended.

Exploration and planning of new research and educational activities was continued. Attempts were made to broaden future research activity to include the faculty and students of University departments and schools previously not associated with NASA-related activity. A proposal for research was developed for submission to one of NASA's program offices and a training proposal was developed for submission to a field center.

Consolidation of administration of the various activities of the Syracuse/NASA Program was accomplished. Offices were moved to new quarters and a secretarial staff was hired. The new quarters were furnished to be used as a NASA research and educational center. Here research activity and teaching take place, conferences are held and a reference collection is being assembled.

PART I

Multidisciplinary Research and Associated Educational Activities

Grant No. NGL 33-022-090

A. Project Research Reports

This section contains a report on each of the four main research projects under the NASA Multidisciplinary Research Grant. These reports were prepared, for the most part, by the Project Directors.

1. ROLE OF THE PROJECT MANAGER

The effort of this interdisciplinary research team in the first semi-annual reporting period was preparatory and exploratory in nature. During that time the group got itself organized and oriented. Procedural and logistical matters were settled, tentative research plans were drawn, and field trips were made to KSC, MSC, Headquarters, Goddard and MSFC for the purposes of general orientation, establishing contacts, and preliminary or exploratory discussions.

During this reporting period, the information gathered previously was discussed and analyzed. Based upon the knowledge and impressions gained, more concrete research plans were laid and methodology defined. A new series of field trips were taken by interdisciplinary teams to NASA Centers directly involved in the Apollo program. A division of labor among the team members was instituted; thesis and dissertation topics of the participating graduate students were chosen; and the process of dissemination of knowledge gained through publications, colloquia, and seminars was begun.

a. Group Activities

The formal activities consisted of field trips and group conferences as described below:

Between June 30 and December 31, 1968, seven field trips were taken (to MSFC, MSC, KSC, and Headquarters) by various members of the group in teams of from one to five men. Much of the interviewing was done with team members from more than one discipline present to broaden the usefulness of each interview.

These trips and the discussions resulting from them carried the project beyond the exploratory stage into a more concrete data and information gathering stage. This, in turn, brought the goals and feasible scope into clearer focus, and provided the background necessary for the construction of interview schedules and questionnaires to be employed in the third phase to follow.

In the early stages of the research effort this group had some concern over its reception at the NASA installations. It seemed likely that the NASA personnel whom the group wished to interview would be quite busy and might not be able to afford the time required for such interviews. However, the field trips taken thus far have shown that the early apprehensions were without foundation. Investigators were received at Headquarters and the field centers in the most cordial manner, and the degree of cooperation extended was extremely gratifying and encouraging.

(1) Trip to the Marshall Space Flight Center, Huntsville, Alabama, July 23-25, 1968. Following the exploratory trip to MSFC undertaken by Wood (Engineering) and Drucker (Engineering) in June, Wood, Pooler (Sociology), Wilemon (Business), and Hopeman (Business) visited MSFC in July. On this trip it was possible to interview three project or stage managers and three of their sub-system managers in the Industrial Operations organization. These interviews provided a much clearer picture of how a contract is managed, and provided some insights into the relationships between project and sub-system managers. Also, some preliminary insights were gained as to how some managers viewed the concept of project management. The key interfaces between managers in IO and their counterparts in R&DO and in contractor's offices was discussed whenever feasible.

Through an interview with the chief of the Systems Engineering Project office in one of the laboratories in R&DO, a clearer picture was obtained of the functioning of the laboratories and their relationships with IO, KSC, and contractors. An interview with the chief of the Project Support Office within Systems Engineering in R&DO clarified the formal procedure necessary

to commit a particular laboratory to undertake work at the request of an Industrial Operations Office. Other interviews with the Deputy Manager and Assistant Manager of the Saturn V program and with members of the Executive Staff office further clarified the operations of IO and the whole center.

(2) Trip to the Manned Spacecraft Center, Houston, Texas, August 7-9, 1968. The participants were Hopeman, Wilemon, Drucker, Pooler, Sallett (Sociology). Differences in the organizational set-up and mode of operation between MSC and MSFC were explored on this trip. Of particular interest was the difference noted in the use of the functional offices (sometimes called Mueller or GEM blocks) at MSC and their reporting responsibilities. Also, it seemed less likely that project managers and sub-system managers with comparable responsibilities to those at MSFC could be identified.

There was an opportunity to talk with Professor Howard Johnson, of the University of Texas, who was working at MSC for the summer. The documentation of NASA operations was explored and some additional avenues were found for further literature search.

(3) Trip to Kennedy Space Center, Florida, August 28-30, 1968. Five members of the research team, Hopeman, Wilemon, Wood, Anna (Political Science) and Lasher (Business) traveled together to KSC. This trip was purposely scheduled after the trips to MSFC and MSC so that the KSC operation could be better understood. As was true at the other centers visited, it was found by the team that direct interviewing and observation brought out features of the organization not apparent from the organization charts.

Of great interest at KSC, particularly since this visit was close to a launch date, was the interaction between KSC and either MSC or MSFC where hardware had to modified. The difference between the responsibility of a stage manager at KSC and that of his counterpart at MSFC was of interest to the group. The relationship with contract technical managers in TOM at KSC was explained.

In order to obtain an understanding of the range of center functions, there were interviews with men from various center offices such as Manage-

ment Systems, Resources and Financial Management, and Design Engineering. The Technical Integration and Evaluation (TIE) contract with Boeing was reviewed in terms of its supporting role in the whole management system, and there was an opportunity to talk briefly with the deputy manager of the Apollo Applications Program (AAP) at KSC.

(4) Trip to NASA Headquarters, Washington, D. C., October 10, 1968. Wilemon and Hopeman spent one day in Washington primarily to examine sources of information for this project. While there, an opportunity arose to talk to Mr. R. L. Mandeville who is working at Headquarters on his doctoral dissertation on project management. The range of his sample, his questionnaire, and his bibliographical references were discussed.

Mr. D. F. Seaton of the Program Control Office discussed with the visitors the uses of various NASA documents and studies. The Automated Management Information Retrieval System (AMRS) developed by GE and used by NASA was demonstrated. The type of information available through the NASA Executive Inventory Bank was discussed with Mr. H. N. Braithwaite of the Executive Personnel Staff. There was a brief meeting with Dr. E. M. Emme, Chief NASA Historian, and with Mr. R. Stevens and Miss K. Beyers of the University Affairs Office.

(5) Trip to Manned Spacecraft Center, Houston, Texas, October 17-19, 1968. This trip was taken by Hopeman to establish a relationship with MSC that would provide the research team with ready access to that center in the future and to identify men whose functions are essentially those of project managers. Discussions with Mr. W. Hjornevik and Mr. E. Young (attended also by Mr. R. Stevens who had arranged the meeting) were very helpful in this regard. The differences in organization between MSC and MSFC were again apparent and were considerably clarified.

(6) Trip to NASA Headquarters, Washington, D. C. December 11-13, 1968. This trip was undertaken by Hopeman and Lasher primarily to get a view of the Apollo program from an organizational level above that of the project manager. In the study of the role of the project manager, these two

investigators are strongly interested in his position in the "vertical" structure of the whole Apollo program.

There were extensive discussions with men in the offices of Program Control, Resource Analysis and Cost Reduction at Headquarters. One topic dealt with was the change in the program as it passed through its various stages towards completion. Also stressed was the means by which Headquarters tracks the progress of all aspects of the program. Relationships with con-contractors and opinions on the effectiveness of project management in general were brought out.

On this visit to Washington, the two participants spoke to Mr. R. Chapman of the National Academy of Public Administration. He reported on the progress of the investigation by NAPA of project management, which overlaps in some areas with this study.

(7) Trip to NASA Headquarters, Washington, D. C. December 19-20, 1968. The two participants who are most concerned with the history of the development of project management in NASA, Pooler and Sallett, visited Headquarters primarily to investigate the information sources available to them in this study. They met with Dr. E. M. Emme, Chief NASA historian, who pointed out various sources, and who referred them to Mr. J. Holmes of the Office of Manned Space Flight, who has considerable insight into the Apollo program and its administration.

A regular series of meetings of all the members of the group was used as a means of integrating the various activities carried out by individuals and sub-teams and of focusing interdisciplinary attention on a common subject. During these meetings, field trips were planned and the reports of the returning teams discussed. As a result of these meetings the objectives and methodology of the specific research tasks were further clarified. Among the decisions made which affect the work of the entire group is the definition of the "project managers" which form the universe of this study. Project managers of three categories apparently exist. These may be described as (a) hardware oriented (e.g. stage) (b) functional (e.g. systems engineering) (c) mission oriented (e.g. launch operations.) It was decided that

the most important category for this research study would the hardware oriented manager, which consists of a limited number of persons called project and sub-system managers at MSC and MSFC.

b. Research Plans and Methodology

It is necessary to divide the research effort into a number of sub-tasks to make use of the special competence of the various team members as well as to suit their diverse academic interests. The interdisciplinary nature of the work is preserved through group planning and group criticism in regular meetings and conferences. The following is a brief description of the plans and objectives of the sub-tasks of this research effort.

(1) Program Management and Non-hierarchical Public Management. Prof. Frederickson's (Political Science) research on the management of managers is being coordinated with Mr. Anna's (Political Science) work on non-hierarchical public management in order to strengthen and facilitate both efforts. During the initial months of the period, Frederickson familiarized himself with the organizational structure, mission, and past history of NASA in general. He also made a detailed study of literature on matrix and project management. This was followed by an intensive study of the Apollo program organizational structures, mission, and past history with particular reference to the field centers and their management. Mr. Anna entered the project in August and spent most of that month familiarizing himself with the Apollo program and the organization of MSC and KSC in preparation for participation in an exploratory trip to the Kennedy Space Center in late August.

The next part of the period was spent in working out the details of a combined research effort and when these details were fairly well advanced they were submitted to the rest of the project manager research team for comments, suggestions, and evaluations.

The last part of the period was spent in developing an open ended interview schedule for use in interviewing project and sub-system managers. Because of the busy schedules of the people to be interviewed, this schedule

had to be revised and reworked several times in order to get as much information as possible in as short time as possible. The process of revision was in progress when the period ended.

(2) Analysis of Project Management as an Organizational Phenomenon

While project management is utilized as an organizational device, it is also a little analyzed abstraction when viewed as part of the doctrine or philosophy of operation of the Apollo program. To assess this dual character of project management in the Apollo program, Prof. Pooler (Sociology) and Mr. Sallett (Sociology) are attempting to organize relevant material around three themes: (1) What were the preconditions that resulted in the adoption of project management as a core idea in organizing the program? (2) How was the abstract doctrinal idea of project management made operational? (3) What were the organizational consequences of deciding to use the technique of project management?

The Apollo program will be viewed from two perspectives in answering the questions posed above- the total Apollo program (a macro-orientation) and two specific projects located at different centers (a micro-comparative orientation). This will allow both an in-depth and generalized presentation. Also, the Apollo program will be looked at from a historical perspective. The life cycle of the program will be traced, examining those contingencies, both personal and social, within and without NASA, which resulted in the organizational changes that manifested themselves.

Thus far, concern has been mainly with obtaining and analyzing historically relevant documents in order to understand the nature and kind of project management doctrine developed. When this is completed, the Apollo program will be examined by utilizing existing documents, and from interviews; reports by other members of the Project Management Group at Syracuse will also be used. An understanding of the social meanings attached to project management as doctrine is necessary to adequately understand the ways in which the project management concept became actualized in the different centers. It is hoped that this somewhat ambitious study will provide some insights into the strengths and weaknesses of utilizing project management as an organizational device.

(3) Project Management: A Study of External Interfaces. The importance of the several relationships between project manager, R&DO or equivalent staff personnel, and contractor became obvious to the group at an early stage in the study. Whereas all of the tasks of the study will inevitably be concerned with some aspect of these relationships, Professors Wood (Engineering) and Drucker (Engineering) have proposed to concentrate on two particular aspects.

Wood will consider in depth the relationship of project managers with research and development organizations and personnel within NASA. Because the particular organization at MSFC is best suited for a study of this interface, interviews will be predominantly at that center.

Drucker is undertaking a detailed study of the project manager--contractor interface, and will attempt to interview contractors at their plants as well as the corresponding project managers. Due to the proximity of Grumann Aircraft Engineering Corporation and the nature of contracts from MSC, projects originating from that center will be the prime targets of this study.

The tasks of Wood and Drucker will overlap considerably, and it is anticipated that interview information can be exchanged effectively. The investigators intend to make visits and conduct interviews at the centers in cooperation with other team members. Wood and Drucker will cooperate in the preparation of interview outlines and questionnaires by others and participate in their administration.

(4) Management Systems as Utilized by Project Managers. Associated with the organizational setting for project management and the role of the project manager within it is the operation of several management systems. These systems provide linkages among contractors, project managers, representatives of both institutional and programmatic organizations, and devices for the integration of activities between centers horizontally and to headquarters (OMSF and APO) vertically. The type of questions to be researched in this area are directed toward an understanding of those management systems

which are quite significant with respect to meeting the objectives of project management...cost performance, schedule performance, and technical performance.

NASA management systems as used by the project manager are the research focus of Professor Hopeman (Business). During the period June-December, 1968 he gathered a substantial amount of information concerning this area through interviews and contacts with NASA personnel at Headquarters, MSC, MSFC, KSC and Goddard in a series of eight field trips.

(5) Project Management, a Concept of Structural Design and Organization Behavior. Professor David Wilemon and Mr. John Cicero are involved in a two-fold research effort. The first aspect of this research is primarily concerned with organizational definition in terms of the design and structure of various project systems. This involves establishing and differentiating a number of project management models such as Phase Management, Matrix Management, and Program Management. Beyond this, there is emphasis on the network of interfaces between and among the various organizational groups impacted by these task-oriented structures for the purpose of defining the continuum of work flow through the project organization. Areas of critical impact between program management, research and development, and contractor organizations is of special concern. These interfaces will be viewed on a broad scale among centers within NASA and will be critically examined in a microsense within the various centers.

Once the overall organizational design is established, the research will focus on organization behavior at critical management levels within the organization. Program management, project management, and sub-system management will be viewed in terms of the manager's role within the project environment. His role will be established through his own organizational perception and as perceived by those groups he most frequently interfaces with. Concepts of authority, motivation, leadership, job satisfaction, role conflict, and role ambiguity will be of paramount importance in establishing the behavioral environment of the various management levels within the project organization. In essence, therefore, this research

will first establish the formal organizational setting and then examine the modes of operation of critical management personnel within that organization both at the formal and informal levels of organization behavior.

c. Development of Dissertation and Thesis Topics

(1) "Non-hierarchical Public Management in Science and Technology," Henry J. Anna (Political Science). This dissertation will examine the environmental constraints and requirements of the Apollo Program from the viewpoint of the project managers. It will explore the project manager's conceptions of his position and responsibilities in relation to the regularly constituted hierarchies of the organization. It will attempt to identify the types of environmental constraints that project managers feel, whether these are technical, budgetary, social, or political, and to examine how project managers work within such constraints.

(2) "A Conceptual Model for Analyzing and Predicting Managerial Effectiveness," Harry J. Lasher (Business Administration). The purpose of this dissertation is to discriminate between effective and ineffective projects in the Apollo Program. Specifically the researcher desires to determine variables which will predict effectiveness and ineffectiveness in complex research and development operations. This predictive model will be developed through an intensive study of the effectiveness with which Apollo Project managers have managed the acquisition of the major hardware components of the Apollo Program Research to date has not produced satisfactory explanations and measurements of effectiveness.

(3) "The Consequences of Project Management Organization for the Apollo Program: A Comparative Study," Alphonse Sallett (Sociology). This dissertation will be concerned with the routinized social meanings that develop in specific projects within large organizations and the consequences this has for the maintenance of the projects through time, from the perspective of both the larger organization and the members of the projects themselves. The selection of two projects is proposed, one at Huntsville and one at Houston, for a comparative study. The dissertation is an integral part of the larger study of Pooler and Sallett.

(4) "The Mobility of Project Managers With the Apollo Program," John P. Cicero (Business Administration). This thesis will identify the mobility patterns of certain project managers involved in the Apollo Program. The purpose will be to trace mobility within the past ten years leading up to the project management position. The study will include demographic data as well as pertinent descriptive information concerning the project environment.

The process of data collection is complete. The thesis is expected to be completed sometime within the next three months.

d. Dissemination of Information

Several papers were written and lectures presented by members of the group based on the information gathered during the work of the first year. They are listed below:

(1) Working Papers

(a) "The Role of the Project Manager and Management Systems in the Management of the Apollo Program," Working Paper #1, by D. L. Wilemon and R. J. Hopeman, (September 1968). This document was designed to provide a focal point for project management/systems analysis research within NASA. Three basic points of research emphasis are discussed: The Role of the Project Manager; Project Organization; and Systems Analysis.

(b) "Systems Analysis and Management," Working Paper #2, R. J. Hopeman.

(c) "The Spectrum of Project Management," Working Paper #3 by J. P. Cicero, (December 1968). The focus of this paper was a survey of the literature on project management with the intent of establishing: some cognitive base for the study and discussion of project management; some differentiating characteristics of project management; and some areas where empirical evidence is needed to substantiate the theoretical framework already established. The paper presented a conceptual overview rather than dwelling on any particular aspect of project management.

The contents, very briefly, indicate the nature of a project organization from four perspectives: differentiating characteristics of project organizations as a factor of complexity; the effect of the project organization on the existing functional structure; the project manager; and a general behavioral framework. Each of these areas need expansion and empirical verification.

(d) Working Paper #4 (To be issued later).

(e) "Project Management Authority: Some Preliminary Insights," Working Paper #5 by D. L. Wilemon. (December, 1968). The objective of this paper was to discuss several divergent concepts and theories centering around project authority, especially in the aerospace industry. Different models of project organization were discussed in detail along with their resulting impact on the project manager's use of authority and influence.

(2) Interim Reports

(a) "A Conceptual Framework for Systems Analysis," Syracuse University/NASA Interim Report #1 by Harry Lasher (December, 1968). One of the major shortcomings of social science research is the lack of a conceptual framework in which to place the "bits and pieces" of research findings. Behavioral scientists have little difficulty in developing theories, but applications to real-life business situations has been a continuing problem. It is believed that a systematic approach to analysis will yield meaningful results. Approximately six months was devoted to constructing "A Conceptual Framework for Systems Analysis." This has provided the mechanism for placing findings related to NASA into a construct which will accommodate the "bits and pieces" of research findings. One can analyze areas of NASA in proper perspective, formulate and test hypotheses, and attach meaningful significance to the results of the findings.

(b) "The College of Business Administration - Circa 1985," Occasional Paper #1, R. J. Hopeman.

e. Lectures & Seminars

In an effort to disseminate findings in the management systems area,

Professor Hopeman made a number of presentations to academic groups at the University and to business groups as far away as Spokane, Washington. Professor Wilemon made several presentations both within and outside the university concerned with the application of project management as an organizational mechanism in new situations.

2. NASA/BUSINESS RELATIONS

This is a summary of work performed during the period July 1 to December 31, 1968 in the study of transfer of technology to the commercial sector.

The report is subdivided into three parts. The first deals with the progress made in interviewing executives of those corporations whose management agreed to provide information on the process of technology transfer and utilization.

Part "a" deals with the preparation of the reports covering the interviews and investigations.

Part "b" deals with the role of the graduate research assistants in the above programs.

Part "c" deals with lessons learned in the surveys undertaken so far, and changes being made in the current work phase.

a. In the six-month period covered by this report the following corporations cooperated in having a large number of executives interviewed by our research team: The Semi-Conductor and Visual Communication Divisions of General Electric Co. in Syracuse; The Niagara Mohawk Power Company, located in Syracuse; The Corning Glass Works, located in Corning, New York; The Bristol Laboratories of the Bristol-Myers Company, located in Syracuse; The Morris Machine Works located in Baldwinsville; and The O. M. Edwards Co., a sheet metal company, located in Syracuse. A total of 92 executives of these companies submitted themselves to intensive questioning by our research team members. The largest number participating were those of the General Electric Co. (59 executives). A major effort was made to line up for further

interviews during the first 6 months of 1969 the following companies: Allied Chemical in New York and New Jersey, Mobil Oil Co. in New York and New Jersey, and the Carrier Corp. in Syracuse. At the end of the period under review initial contacts with these companies had been made and a tentative schedule for initiation of the interviews was established.

Efforts were also underway to appraise various institutionalized approached to technology transfer. Technology Utilization officers at two NASA facilities (Goddard, Greenbelt and Electronics, Boston) were interviewed. Personal contact with staff members of Regional Dissemination Centers was established through field visits to the Pittsburgh, Pa. and Storrs, Conn. Centers. Officials of the Small Business Administration's Technology Utilization staff were interviewed in Washington headquarters and the Boston field office. A successful commercial information system, GE's EMPIS, was also studied.

In September, upon invitation of the Technology Utilization Office in Washington, two investigators attended a NASA Technology Utilization Conference for the Electric Utility Industry at Lewis Research Center. Prior to attending this conference, and also upon request of the Washington TU office, we submitted an early report of our findings regarding Technology Transfer in the Electric Utility Industry.

During the period under review reports distilling the information obtained from the interviews were prepared. The following reports were completed and forwarded for circulation to the director's office:

(1) The technology transfer process at the Semi-Conductor Division of General Electric.

(2) The process of technology transfer at the Visual Communication Division of General Electric.

(3) The process of technology diffusion and dissemination at Corning Glass Works.

(4) The technology transfer process at the Niagara Mohawk Power Co.

These were identified as Working Papers 1, 2, 3, and 4, respectively. It must be understood that these papers are descriptive surveys dealing only with one aspect of a particular company's operation and do not represent the approach that will be followed in the final report. They serve as building stones for the structure that is to be erected.

b. The conduct of the interviews and the preparation of the reports were substantially assisted by four graduate assistants who were drawn into the work in the course of the six months under review. They are as follows: Robert Hamilton, a marketing major; Jay Lewis, also a marketing major; Jonathon Kaplan, an organization and production major; and Edward Bocian, a graduate in chemical engineering and now a marketing major.

c. During the previous six months the emphasis in the conduct of interviews and the write-up of reports concentrated on the channels of communication which operate within the firm to promote the transfer of knowledge and data dealing with a new product or a new process or new machinery. Relatively little time was spent on the decision-making considerations which lead to the final evaluation, screening, and adoption or rejection of a particular package of technology.

Obtaining information on these matters has proven far more difficult. The lesson learned from the work in the last six months is that we must shift our technique in covering these subjects. Consequently, the research questionnaire, which lists the topics to be covered in the interviews and eventually in the reports, was redrawn towards the end of the six-month period.

A shift in emphasis in the work now being projected is evident from a comparison of the new questionnaire with the old. Problems which have been found to be crucial are perhaps best summarized in the sections of the new questionnaire which deal with the major factors which cause a company to search for and accept innovationary ideas.

In particular it will be our task to separate out and evaluate the roles of the following: First, the protection of a market, or a product or a service provided by a company, against rivals offering new technology, new processes or new products. Second, the improvement of the earnings position of the company. Third, securing or maintaining a minimum or target rate of growth through the adoption of new technology. Fourth, securing or maintaining a leadership position in the state of the art in the industry. And finally, the protection of prestige or the securing of prestige in the industry.

In addition, there will be emphasis on the innovationary decision itself, not only on the organizational channels through which decisions are arrived at, such as particular job holders or committees or departments, but also upon the role which each of the major executive layers in a corporation play in arriving at such decisions. It is hoped that in shifting the emphasis to these and related subjects a more meaningful contribution to the understanding of technology transfer will be forthcoming.

Another lesson learned deals with the incorporation of some of the ideas gathered into our teaching program. The possibility exists that the problem of technology transfer could be incorporated into existing courses, for example, in production organization and management, in accounting, in managerial finance, or in marketing. There is also the possibility of a separate course dealing specifically with the subject of the management of technology transfer. This would draw on contributions from the engineering faculty but would be firmly lodged in the business school. Finally, if an international dimension is added to the technology transfer research project, (as will be proposed), the findings may be incorporated in international business courses.

The ultimate pay-off that the school may therefore derive from this project is to modify the nature of one approach to business education, specifically to enlarge the number of dimensions covered by courses that are now narrowly departmentalized. It is expected that in the near future

effects of this "osmosis" will be noted in our teaching program. While there is no obstacle to including in existing course outlines subject matter having a bearing on technology transfer, the ultimate aim of this research group is to propose to the faculty a specific new course or seminar on technology transfer.

Third, it is now evident that the questions and topics to be covered do not lend themselves to response by mail or self-administered questionnaires. For this reason the remaining phase of the survey will be devoted to an intensive interview program limited to a relatively small number of companies. We will be dealing with questions of selecting companies of different size, companies with different markets, with different relationships to customer classes, (that is, industrial buyers or wholesalers or retailers or final consumers) and other criteria. We do not expect to include more than one or two companies in each of the major categories.

We have tentatively selected the following industries for representation in the sample: the chemical industry (other than the drug industry) and for this reason it is hoped that the Allied Chemical interviews will prove fruitful; the oil industry--Mobil Oil; the machinery industry; in this connection the arrangement made with Carrier Corp. seems fairly certain; a consumer good industry--initial contact with the Singer Co. has been made.

We have also developed some ideas for interdisciplinary projects and studies which may find a place in the NASA/Syracuse program:

(1) Educational programs on the sources and uses of information. Many small business managers do not avail themselves of available services because they have not been educated to use them, and because they are unaware of the potential value. This is also true of engineers in large companies, who rely on verbal exchanges with colleagues for information needs.

(2) Discretionary funding as a source of new technology. Should government research programs (e.g., NASA) be strictly limited in objectives (e.g., space exploration), or should logical extensions of scientific expertise be permitted and/or encouraged?

(3) Technology transfer as an anti-poverty tool. Here there are great possibilities for application of both technical and managerial skills in the development of new small businesses and individual job capabilities. These include, for example, new construction techniques which could be easily learned by the uneducated and unskilled.

(4) In addition during this period additional work was done on a proposal for a new study of international technology transfer.

3. CASE STUDIES

The Case Study Program's activities in the Syracuse/NASA Program fall under two heads: (1) the preparation of two large "Decisions-in-the-Making" Studies (Post-Apollo and Weather Modification) and (2) Experimental efforts at producing shorter cases and similar studies about significant management and policy-making aspects of NASA's world.

Short Studies:

Intensive activity on short studies is not planned or budgeted to begin until the fall of 1969. However, during the report period, Professor Edwin Bock (Political Science), the Project Director, began consultations with faculty and graduate students at Syracuse and other universities, and with a few NASA officials. One objective was to encourage a flow of "leads" for worthwhile short studies from those engaged in other aspects of the Syracuse/NASA program. A second objective was to sample similar suggestions from NASA.

Perhaps the most hopeful and potentially significant possibility explored by Professor Bock is the idea of experimenting with the production of short field studies by NASA fellows and other advanced graduate students as a part of regular course work, research seminars, and dissertations. Explorations are being made of the possibility of initiating a special research and readings course that would encourage a select number of students to carry out supervised research and preparation of a short studies under faculty supervision, using travel funds under the NASA program.

Randolph Kucera, a Ph. D. dissertation candidate, working under Professor Bock, has taken as his subject an investigation of the perspectives of higher officials and senior engineers of a large aerospace firm, on the question of their relationships to contracting government agencies, including NASA. The significance of this topic was suggested to Professor Bock at least partly by experience gained in the conduct of case studies in the first NASA contract with Syracuse University from 1963-67. It is expected that the student researcher will gain valuable additional data from his conversations with NASA officials, and his research data on private sector managers have already proven useful to faculty sociologists and engineers working on the NASA Project Manager study in the Syracuse/NASA program. This researcher's field work will be partly financed by the budget for short cases.

Weather Modification Decision-in-the-Making

Professor Lambright (Political Science), spent most of the reporting period organizing data gathered during the period from January to September and writing a preliminary draft of this study. About 400 pages of rough manuscript were completed by the end of the report period, and writing was still in progress. The shaping of a finished first draft was being aided by the editorial assistant. It is expected that a first draft for circulation to major actors will be completed in March. The outline of the study follows.

Appendix

OUTLINE OF WEATHER MODIFICATION STUDY

Introduction

Part One: The Great Rainmaking Controversy, 1946-1952

- Chapter 1. Origins of Weather Modification
- Chapter 2. The Weather Bureau Reacts
- Chapter 3. Project Cirrus Moves Ahead
- Chapter 4. The Weather Bureau and Weather Modification Policy
- Chapter 5. Langmuir Versus the Meteorologists

Chapter 6. The Scientific Controversy Expands
Chapter 7. The Debate Becomes "Political"
Chapter 8. "Rainmaking" Crests and Cirrus Ends

Part Two: A Period of Holding Action, 1952-1958
Chapter 9. The Weather Bureau Tries to Lead
Chapter 10. Legislation is Passed
Chapter 11. Weather Bureau Versus Krick
Chapter 12. The Orville Committee
Chapter 13. Weather Modification Goes to NSF
Chapter 14. Orville Committee Final Report and the "Flatlands Affair"

Part Three: The Resurrection of Weather Modification, 1958-1966
Chapter 15. NSF Launches A Weather Modification Program
Chapter 16. Enter Bureau of Reclamation
Chapter 17. Weather Modification as Foreign Policy
Chapter 18. New Looks at Weather Modification
Chapter 19. Bureau of Reclamation as Storm Center
Chapter 20. The National Academy of Sciences Calls Rainmaking "Astrology"
Chapter 21. The National Academy Reverses Itself

Part Four: A Decision-in-the-Making, 1966-1969
Chapter 22. High Hopes but Viet Nam Cutbacks
Chapter 23. The Future in Present Perspective
Conclusion

Post Apollo Decision-in-the-Making

Professors Emmette S. Redford and Orion F. White of the Department of Government, The University of Texas at Austin began work on the project on June 1, 1968. Redford has worked on it full-time from June 1, 1968 to January 15, 1969 and White full-time from June 1 to August 31 and half-time from September 1 to January 15.

The authors substantially completed research on the project in Washington from June 1 to September 30, inclusive. Some follow-up research has been conducted since September 30 at the Manned Spacecraft Center, the Marshall

Space Flight Center, and in Washington. Except for a few interviews and particular bits of information to fill gaps, the research is completed.

The data sources are documents and numerous interviews. There were some difficulties and delays in the research due to the necessity of declassification of documents, the absence of top officials from Washington for attendance at the Vienna conference in August, and the tremendous problems in isolating for consideration the complex, diffuse, and organizationally-distributed post-Apollo manned space program. Nevertheless, NASA officials offered, with few exceptions, complete cooperation and an open-door policy on information. The result was a mass of data to be arranged, analyzed, and organized for presentation.

Since October 1 the authors have been engaged primarily in this task. A tentative analytical model and statement of questions of concern developed in the summer of 1968 has proved to be suitable for organization of a book. The plan calls for analytical chapters on government's confrontation with science and technology and on NASA's decision-making structure, processes, and perspectives. Second, a case-study presentation--a review of events sequentially--of considerable length and detail is being prepared on post-Apollo manned space developments between 1961 and 1968. Major attention is being given to developments within NASA, the Executive Office of the President, and the Congress, but appropriate attention also to relevant action in the scientific and industrial communities. The presentation will conclude with an analytical chapter on the way the administrative-political system has handled the issue of post-Apollo manned space flight.

Approximately half of the book has been completed in a first, quite rough, draft. Professor White has a supplementary grant of his full-time services from the University of Texas for the months of February and March for this project. Although Professor Redford returns to teaching on February 1, he will continue to work on this project. The authors hope to complete the first draft of a manuscript by March 31. It is their hope, also, that after appropriate readings, revisions of the draft can be completed during the summer of 1969.

4. REGULATIONS IN SPACE

a. Research Personnel

The field research during the summer of 1968 followed largely the lines anticipated in the original proposal and in the first Semi-Annual report. Three law students from Syracuse University: Mssrs: John Warsaw, Ross Radley, and David Miller spent a ten week period at the Kennedy Space Center, the Manned Spacecraft Center, and the Ames Research Center respectively. Mr. Stephen Rosen, a political science graduate student, was provided an internship at the Manned Spacecraft Center and worked cooperatively on the Houston project. The field research was supported by two students working at Syracuse University: Mr. Peter VanAllen of the College of Law and Mr. Barry Kelmachter, a graduate student in aerospace engineering. Full support to the research effort was given by the chief counsel's office at each of the centers. At the Kennedy Space Center, Mr. Warsaw's research was augmented in several particulars by work done by students regularly assigned to the center on work-study programs.

For each of the graduate students involved the work provided the opportunity of becoming intimately familiar with the operation of a field counsel office in the Space Administration. Those assigned in the field worked in the legal offices examining legal files and discussing problems with field attorneys. Those working in the Syracuse office were familiarized with the legal activity of the Space Administration by their review of materials submitted to them from the field and by research done in support of the field researchers. For all the students, this close contact with the activities of the National Aeronautics and Space Administration proved to be stimulating and enlightening. Each feels he now has a better knowledge of the day to day operations of the agency and of its legal problems than he had when the work began. Furthermore, the opportunity offered at interdisciplinary work with other graduate students cooperating in the project provided an opportunity for the exchange of perspectives developed in their respective graduate programs which, to that time, had been limited to their own discipline. For the Director of the project, Prof. George J.

Alexander, Assoc. Dean of the Law School, the contact with research at each of the centers and personal contact with the counsel at those centers provided a similar broadened perspective. While neither he nor the graduate students have, as yet, formally applied the training received to the graduate programs at Syracuse University, extrapolations from the work done have found their way into various programs. As an illustration, the Director is a consultant to the Educational Policies Research Center at Syracuse University. The Center is engaged in research concerned with future educational policies in the United States. Much of its work concerns projecting present policies into future scenarios. The concern of the Space Administration with problems of the future has provided broad insights of immediate application to that work. In similar ways, the graduate students who participated in the project have been able to integrate their new insights into their graduate research. A high level of enthusiasm remains in the entire group for continued research into problems of emerging space law. Two of the students who engaged in field research continued research into space law problems through the reporting period, doing their work at Syracuse University on a part time basis in addition to their normal legal studies.

b. Research product

As was to have been anticipated, a good portion of the time spent in the field was devoted to an orientation of the field researchers to the operations of the offices at the three centers to which they were assigned. After the orientation was completed, the students, assisted by the Director who visited each of the centers, selected problems that had previously arisen at the centers for closer study. They examined the background of the problem in its field setting, the legal documents connected with its resolution, and such other information as could be provided by counsel's office or by others at the centers. While the ultimate goal of the project remains the creation of teaching materials which will allow students in graduate programs to deal with the problems of emerging space law, the initial work at the centers concentrated on the acquisition of information about those problems and the preparation of memoranda describing their reso-

lution. It was not and is not the intention of the project to use these memoranda independently of their integration into teaching materials. They do, however, provide an excellent background for students who will engage in research work in the project in the future and will be invaluable in structuring the problems to be integrated into the teaching materials to be prepared. In each case, the memoranda are supplemented by the major available documents concerning the problem in question. Ultimately, the supplemental documents, rather than the memoranda, will comprise the bulk of the teaching materials. The memoranda prepared concerned:

(1) Human research: This memorandum deals with the problem of exposing humans to technological, biological and psychological hazards in connection with the space program. It traces the necessary safeguards from a legal perspective and chronicles the evolution of NASA policy in this regard.

(2) Recovery of Space Fragments from Private Property: This work traces the legal difficulties to be anticipated in accommodating the rights of land owners to objects on their property and those of the federal government to recover space objects. It also concerns itself with the question of the scope of legally permissible search for space objects on private property.

(3) Sonic Boom: This memorandum traces the problems of liability for sonic boom associated with the flying of supersonic air craft.

(4) Corpus Christi Tracking Station Radio Interference Problem: This memorandum traces the litigation arising out of the needs to prohibit commercial activity in the vicinity of the tracking station to avoid radio interference with its tracking function. While the problem is specific, its more general implications concerning the right of the Space Administration to enjoin otherwise lawful activity in protection of the space program are of extreme importance in developing legal principles concerning space.

(5) Compensation for Domestic Space Casualties: This memorandum traces the limits of present authority to compensate those injured in the United States in the event of an accident arising in the space program. It

highlights the limitations of the present compensatory scheme and contrasts them to tort principles applicable to other types of injuries.

(6) Governmental Payment of Liability Judgments of Contractors Under Contract Provisions: This memorandum traces contractual principles through which the government ultimately reimburses for casualty losses for which contractors are held responsible. Since this method of payment provides a circuitous route of compensation for casualty losses, it has significant impact on the general provision limiting direct compensation.

(7) Legal Relations Between Space Centers and Adjacent Communities: This memorandum traces the problems of law enforcement at space centers and the use of space center emergency equipment for the benefit of local communities. The operation of the space program at centers which are, in the main, within the jurisdiction of the state in which they are located raises interesting questions of the interfacebetween state and federal policies and legal principles.

(8) Back Contamination Control: The Lunar Receiving Laboratory: This memorandum traces legal problems incident to the control of contamination from outer space. It chronicles the creation of the interagency committee on back contamination and analyses the legal authority that each of the component members brings from his agency. Additionally, it briefly reviews the law of quarantine and extrapolates from prior cases its application to the control of back contamination.

In addition to these memoranda, research was begun on a number of international questions of space law. Among the problems investigated were the rescue and return of astronauts, international casualty liability for space disasters, claims to celestial bodies, and national control of airspace and outer space. In each case, this work was abandoned because it appeared of only marginal relevance to the work of the field centers. The experience of the research conducted during the summer of 1968 indicated that the major focus of the project should be domestic legal problems rather than those primarily of international concern.

Because of the involvement of the Director in the work of the project, he was invited to membership on the Space Law Subcommittee of the Committee on International Law of the American Bar Association and elected to life membership in the Institute of Space Law of the International Aeronautical and Astronautical Institute. The latter invited him to deliver a paper at the 11th International Colloquium which he did on October 18 of 1968. The paper was entitled "Legal Frontiers in the United States Space Program" and is to be published in the proceedings of that Colloquium.

c. Plans for the future

The work to date has not indicated a need for a redesign of the original project proposal. Other than its identification of domestic problems as being more relevant than problems of international space law, the work to date proceeds along the lines originally proposed. During the forthcoming reporting period, Professor Malcolm Schlusberg will begin his investigation of contract dispute resolution practices in the Space Administration and background work will continue at the Syracuse University College of Law through graduate students. A summer field program will be prepared for the summer of 1969.

The work on domestic problems of evolving space law in the United States has generated interest among several members of the law faculty in an examination of the impact of space law on the domestic law of other space countries. Accordingly, exploration will be begun into the feasibility and desirability of conducting comparable studies on the evolving space law in selected foreign countries in the near future.

B. Other Ongoing Research Activity

1. INTERNATIONAL OPERATIONS: THE TRACKING SYSTEM

Neil Hollander, a doctoral candidate in Political Science at the Maxwell School, joined the staff of the National Academy of Public Administration in the summer of 1968 where he is engaging in a study of one dimension of NASA's international activities, that of the tracking system. The study is being conducted by the Academy at the request of NASA. Since it will also

serve as Mr. Hollander's doctoral dissertation, it is being supervised, from that point of view, by Prof. John Honey.

This study will focus on the operation of the tracking stations, analyzing the actions of the Operations Support Division of the Office of International Affairs and the Office of Tracking and Data Acquisition. It will be concerned with the methods used in reaching the goal of a highly reliable tracking system operating in many different political, administrative, cultural, and geographic environs and will assess the extent to which the experience derived from the operations of tracking stations is more generally applicable to other international organizations.

A survey of the literature and files will provide the foundation for the research, it will be necessary to focus on them before the other phases of the study are begun. Since a great deal of the information relevant to the undertaking exists only in the minds of the people involved, a major part of the research will involve open-ended personal interviews. From these interviews, as well as from the public records and files, information concerning a series of key questions and relationships will be developed. These data will be the basis of the final report which will be completed approximately eleven months after work is commenced.

During the July 1, 1968- December 31, 1968 period, Mr. Hollander did background reading in the relevant literature and consulted with various individuals at NASA Headquarters on the development and shaping of a detailed research prospectus. The prospectus was completed by the end of the reporting period.

2. MULTIDISCIPLINARY RESEARCH IN UNIVERSITIES

William E. Davis, a Doctoral candidate in Political Science at the Maxwell School and Research Assistant to Professor John Honey, is presently engaged in a study of NASA's efforts to encourage multidisciplinary research activity at American colleges and universities through the institutional grants of the Sustaining University Program. This study, a report to the Office of University Affairs and a Master's Thesis for Mr. Davis, is intend-

ed to accomplish two primary purposes: (1) an assessment of the degree to which a selected small sample of universities have engaged in, increased or expanded multidisciplinary research and teaching activity as a direct result of NASA/SUP support; (2) an identification of some of the most important factors which appear to be linked to the successful accomplishment of multidisciplinary research in universities. In addition, it is expected that this study will suggest something about the ability of NASA, or other externally supporting agencies, to successfully advance multidisciplinary activity in universities.

During the reporting period, Mr. Davis made several visits to the Office of University Affairs, NASA Headquarters, to gather background information on the Sustaining University Program. NASA personnel were interviewed and a file search was made. A survey of the scholarly literature on the subjects of academic research, the categorization of knowledge into disciplines, and problems in cooperation across disciplinary boundaries was made. A mail questionnaire was devised and then abandoned in favor of the development of an interview schedule for subsequent visits to several university campuses during the Spring 1969 semester. Efforts were made to determine appropriate measures of research product, and to prepare a hypothetical list of factors most closely related to the accomplishment of successful multidisciplinary research activity.

C. Educational Activities in Connection with Research

1. STUDENT SUMMER ASSIGNMENTS

a. David Curzon, a Doctoral candidate in Economics at the Maxwell School, spent June through August, 1968, assigned to the office of Mr. Robert L. Mandeville, Chief, Resources Management and Program Review, Office of Space Applications, NASA. His major activities during these three months consisted of writing, individual discussions, and meetings related to: (1) A cost-benefit study of the Earth Resources Program performed under contract to NASA by Planning Research Corporation. (2) A cost-effectiveness study of several existing satellite systems. (3) Use of the Goddard Cost Experience Group's cost model for checking estimates of contractors. (4) Miscellaneous

activities including the preparation of the Program Memorandum, and the design of an input and output format for an ADP system.

b. Larry H. Dale, an Engineering Graduate from Cornell, and a NASA trainee-designate for the 1968-69 year, was assigned to the International Technology Affairs Division of the International Office of NASA during June through August 1968. Mr. Dale was involved in an internal review of NASA's position with regard to the export of certain technology and materials by the Federal Government. This required his interaction with technical experts from other agencies and the preparation of a final written document. Pursuing these and other activities enabled Mr. Dale to become acquainted with some of the background material on the applications of space technology in developing countries. During his assignment, Mr. Dale also did a study of the munitions control procedures over inertial guidance systems.

2. INTERDISCIPLINARY SEMINARS

A general meeting of all Syracuse/NASA Program participants was held on September 30, 1968, for the purpose of planning and program evaluation. At the meeting, plans were announced for a series of monthly interdisciplinary seminars dealing with Systems Theory and Systems Analysis, particularly their use by the various academic disciplines. Under the direction and planning of Prof. Nathan Schwartz, Associate Director of the Syracuse/NASA Program, the series included the following presentations and discussions:

a. October, 1968: Prof. Nathan Schwartz discussing "General Systems", and Prof. Richard Hopeman discussing "Systems Analysis and Decision Making".

b. November, 1968: Prof. Bruce Berra and Prof. Robert Sargent discussing "System Fundamentals".

c. December, 1968: Prof. Bruce Berra and Prof. Robert Sargent discussing "Applications of Systems Analysis".

These seminars were well attended by a broad cross section of the university community. In addition, they served as a means of communicating matters of general interest to members of the program. By the end of the reporting

period, Professor Schwartz had scheduled future seminars on Modeling and Social Science Applications.

3. SEMINAR ON SCIENCE IN THE POLITICAL PROCESS

During the reporting period Professors Henry Lambright and John Honey prepared to offer a seminar entitled "Science in the Political Process" during the Fall, 1968 semester. While the course was postponed until the spring semester due to scheduling problems, two students undertook individual study on the topic under the direction of Professors Lambright and Honey. One of the students, Mr. Richard Head, spent his time preparing a course for advanced undergraduates in "Science and Public Policy". Upon completion of his Doctorate, Mr. Head will offer the "Science and Public Policy" course at the Air Force Academy.

D. Exploration and Planning Future Projects

1. PROJECTS IN PLANNING STAGES

a. Non-Economic Criteria for Project Evaluation. One result of the NASA summer assignment of David Curzon, a Doctoral candidate in the Department of Economics, was a request by the Office of Space Science Applications that the University submit a proposal to their office for a study of non-economic criteria for project evaluation. Professor George Fisk, Chairman of the Marketing Department of Syracuse University, and Mr. Curzon submitted such a proposal on December 4, 1968. By the end of the reporting period, their proposal had been informally accepted with an understanding that the NASA grant would be supplemented so that the study could be conducted and completed during early Spring, 1969.

As submitted to the Office of Space Science Applications, the proposal called for (1) the development of a rationale for examining non-economic criteria for evaluating potential satellite applications; (2) the preparation of a display of non-economic criteria which should be considered; and (3) an appraisal of the relative significance of these criteria.

b. Goddard Summer Institute in Public Administration. In October, 1968 the Goddard Space Flight Center approached the Syracuse/NASA Program about undertaking a summer program at Goddard for advanced undergraduates. Professors Frank Marini and Henry Lambright indicated an interest in conducting such a program and prepared a proposal. The proposal was submitted to NASA Headquarters and Goddard Space Flight Center on November 25, 1968 and before the end of this reporting period, the proposal was informally accepted with an assurance of separate funding. Professors Marini and Lambright began preliminary work immediately.

A Summer Institute in Public Administration at the Goddard Space Flight Center was proposed for training twenty five advanced undergraduate students. Six academic credits were to be given for successful completion of a ten week program of course work, research on an area of NASA-related administration, and practical work experience. Tuition and fees, and expenses for a field trip to NASA Research and Development Centers were to be provided for each student selected to participate. The primary purpose of the Institute was to stimulate the interest of college students and faculty in the problems of administering complex research and development programs in public organizations. Further it was intended that such a program would foster systematic study, by Syracuse faculty and others, of public administration within NASA.

2. PRELIMINARY EXPLORATIONS

Negotiations have continued with Professor Henry Lambright (Political Science) to become a Scholar-in-Practice beginning in January 1970. The tentative arrangement is that Professor Lambright will have an assignment in NASA's Office of University Affairs.

Professors Iverson and Honey have continued informal exploration with NASA officials on the possibility of developing a special executive seminar to be offered as Mid-Career Training exclusively to NASA personnel.

Professors Honey and Lambright continued their exploration of a study of the significant linkages between the public administration programs and other professional schools in universities in which there are well defined

programs in public administration or public affairs. Such a project would include evaluation of the prestige, leadership, and quality of teaching and research of public administration programs by the faculties of other professional schools.

In December, Professors Honey, Barzelay and Hopeman had extended talks with Messrs. Marcel Depasse and R. Gibson of the European Space Research Organization. They traveled to Syracuse for two purposes: to inquire about the nature of the Syracuse - NASA relationship and discuss future collaborative efforts between ESRO and European universities, and to inquire about the possibility of the participation of some of our researchers in a summer conference on management aspects of space research. Subsequent to, and as a result of these meetings, Professor Bock has pursued with these gentlemen, the possibility of the Inter-University Case Study Program doing several short cases on ESRO related subjects.

3. POTENTIAL NEW RESEARCH STARTS

With the anticipated completion during 1969 of much of the present research work the faculty presently involved in the Program were encouraged to begin thinking about research which they would like to pursue in the future. Some of their ideas with respect to future projects are reflected in the discussions of ongoing research.

In pursuit of the objective of extending the NASA opportunity to other parts of the campus, encouragement was given to a number of individuals to explore possible research subjects both among members of the Program and the NASA Headquarters in Washington. The following indicate the range of these potential "new starts."

Professor Harry McLaughlin of the School of Journalism is a psychologist with interests in the processes of transmitting highly technical information into more generally comprehensible materials. He has had meetings with Messrs. Bingman and Stephens as well as with other NASA officials and will be visiting Houston during the late Winter or early Spring to determine how he may be able to pursue his interests through a first, exploratory stage.

Professors Sufrin, Price and Henning of the Department of Economics have developed a number of proposals for study dealing with the international economics of the space problem and with manpower issues. These are currently in the process of exploration in Washington.

Professors Ely and Fishell of the School of Education have made preliminary proposals for studies of NASA educational and training activities. They also are engaged in further definition of their ideas through discussions in Washington.

Professors Onsi and Horowitz of the College of Business Administration have developed preliminary proposals centering around accounting systems as information flows to management. Initial discussions with Washington officials indicate that their proposals may need to be considerably reshaped and during the coming semester they will visit NASA Headquarters for the purpose of better defining the kinds of opportunities which would be useful to them.

Professor Edwin Hammond of the Department of Geography expects to spend the first semester of 1970 working at the University of Kansas with Professor Simonett, an expert in infrared remote sensing technology. As part of his Kansas assignment he is hopeing to make use of the resources at Houston. He will probably have a graduate assistant associated with him in the Houston-Kansas effort.

Initial inquiries in the Department of Health, Education and Welfare to Assistant Secretary Simpson indicate responsiveness to developing a Syracuse/HEW Program analogous to this Program. Mr. Simpson suggested that this matter become the subject of thorough exploration shortly after the inauguration in late January, 1969.

E. Program Administration

During the July 1 to December 31, 1968 reporting period, program administration was consolidated and stabilized. In July, a university-owned house adjacent to the campus was turned over to the program. Repairs were

made to the building and equipment procured during the following two months. Offices were provided for the Program Director, his graduate assistant, the Program Secretary, for research faculty and graduate students desiring desk space, the Project Manager Study secretary and for the five NASA trainees. In addition, a reading room and a conference/seminar room have been provided. During the reporting period, a reference collection of documents related to the research of program personnel was begun. The collection is to be located at Syracuse/NASA House.

As of September 30, the faculty and student researchers associated with the Project Manager Study and the Program Director and his staff moved their offices to this new centralized location.

In September 1968, Mrs. Jean Golemo began work as Program Manager and Executive Assistant to the Director. Under Mrs. Golemo's leadership the arrangements for renovating and furnishing the building were completed. She established systems and procedures and has undertaken the day-to-day management of all aspects of the office operations not requiring the Director's immediate involvement.

During the reporting period Mrs. Elizabeth Bye, administrative assistant to the Associate Dean of the Maxwell School continued in her efforts to establish and maintain a daily record keeping and accounting system for the program.

A standard format for documents generated by Program research was agreed upon. The series includes five types of documents:

1. Working papers which are developed as interim reports of concepts associated with project research.

2. Occasional papers which are developed in areas not directly related to project research but which cover topics of interest to the investigators and which are generated through participation in the program.

3. Reports which are unpublished documents submitted to NASA and other interested parties and which represent the final results of particular research projects.

4. Theses and Dissertations which are unpublished results of the research efforts of graduate students associated with the project and which represent the writing requirements of their degree programs.

5. Publications including articles, monographs, and books published by professional journals, the university and commercial publishers.

Proposed budgets for the calendar years of 1969 and 1970 for the four main research projects were revised during the reporting period. Proposals for new work under the NASA program in succeeding years were pursued and a supplemental request to NASA for support for additional years was prepared.

During the late Fall the director of the Syracuse/NASA Program was approached regarding becoming Vice President of the University. He began discussions in the Chancellor's office and with senior colleagues in the Syracuse/NASA Program about possible approaches to changing the leadership of the Program.

PART II

Predoctoral Traineeship Activities

Grant No. NGT 33-022-097

During the July 1 - December 31, 1968 reporting period the Traineeship Program established by NASA's grant to Syracuse University came into being. The Training Grant was awarded to Syracuse University for a period of three years beginning September 1, 1968. It supports the training of five graduate students, each for a period of three years, for study in the Maxwell School toward a Ph. D. in Political Science, Economics and other social science disciplines with an emphasis on Public Administration, or toward the Doctor of Public Administration degree.

A. Award Recipients

The five Trainees initially selected for the Program were:

1. Mr. Robert D. Balderston - BA, Political Science, Haverford College, 1965; enrolled in Public Administration Program.
2. Mr. Kent J. Chabotar - BA, Political Science, St. Francis College, Pennsylvania 1968; enrolled in Public Administration Program, Maxwell School.
3. Mr. Larry H. Dale - B. S., Materials Engineering, Cornell University, 1968; enrolled in Dept. of Political Science.
4. Mr. Stephen E. Powers - BA, Political Science, Pennsylvania State University, 1965; enrolled in Dept. of Political Science.
5. Mr. Richard J. Stillman - BA, Political Science, Harvard University, 1966; enrolled in Public Administration Program.

Traineeship recipients were chosen by a committee composed of Stephen K. Bailey, Dean of the Maxwell School; Robert W. Gregg, Chairman of the Department of Political Science; Harvey Martens, Director of the Public Administration Programs; and John C. Honey, Director of the Syracuse/NASA Program.

Mr. David Fauri, a doctoral candidate in Public Administration, joined the Syracuse/NASA Program as Research Assistant to the Traineeship Program

in September 1968. Among other tasks, he was given responsibility for preparing and sending out the announcements for the projected 5 additional traineeship awards for 1969-70.

B. Monthly Meetings

During the first few weeks of the fall semester it was determined that monthly trainee luncheon meetings would be held throughout the academic year. It was intended that these meetings would be attended by the Trainees, the Program Director, the graduate assistants associated with the Program, other interested individuals, and guests invited by the Trainees. The meetings would provide a forum for discussing academic matters, curriculum problems, research prospects for individual trainees, summer internship plans, and other matters of interest to the group. During the period covered by this report, the meetings provided a forum for (1) extended discussions concerning revision of the Public Administration Program curriculum, (2) a presentation by Mr. Davis on his research into "Multidisciplinary Research in Universities: NASA's Experience with the Sustaining University Program", (3) a report by Mr. Dale on his summer assignment at NASA Headquarters, and (4) discussions surrounding the planning of Trainee Internships for the 1969 summer months.

C. 1969 Summer Assignments

During the reporting period, efforts were initiated to explore, within NASA, the possibilities available for 1969 summer assignments for the trainees. Discussions were held with several Headquarters offices concerning the backgrounds of several of the trainees and the appropriateness of certain assignments for summer placement.

D. NASA and Urban Affairs

During the last months of 1968, the Program Director, Professor Honey, was approached by Dr. Stephen B. Sweeney, a consultant to NASA and others in Headquarters, concerning a projected study of NASA's activities relevant to urban problems. A tentative arrangement was discussed whereby one of the trainees at Syracuse, Mr. Robert D. Balderston, would assist Dr. Sweeney in

carrying out this study. Plans were made for Mr. Balderston to spend one day per week in NASA Headquarters during the Spring Semester 1969. His research would be directed at gathering data on past efforts to apply NASA devices and techniques to the solution of urban problems.

E. Public Administration Curriculum Development

As a means of pursuing the ongoing two-year effort to redevelop the Public Administration curriculum, funds provided under the NASA Traineeship Program for curriculum improvement were used in the following manner:

Professor George Frederickson was asked to prepare a report on the so-called "core" courses which are offered to MPA students. The end product of Professor Frederickson's effort is a new core course to be offered on a year long basis. This course, which has now been approved by the Public Administration faculty, will meet the requirements for work in the core subjects of budgeting, personnel, and O & M. It will be offered under Professor Frederickson's leadership with a number of the Maxwell School faculty participating. The course will be offered for the first time in September, 1969.

Work is proceeding on reevaluation of the International Public Administration Program, the doctorate in Public Administration, and the policy-related courses offered in the Maxwell School primarily for the benefit of Public Administration students.

F. Additional Traineeships

In October, 1968, the Syracuse/NASA Program Director was informed that NASA was prepared to consider awarding Syracuse University five additional, three year traineeships in Public Administration and Political Science. A request was prepared by Professor Honey and William Davis, his Research Assistant, during October. The proposal was submitted to NASA in November.